All-Jet Bomber Air Force . . . . .

Apparently, the bombardier is ejected through an escape hatch or chute in the underside of the fuselage nose.

If the Stratojet lives up to the M of 0.95 predicted by the model tests, its top speed at 35,000ft will be 630 m.p.h., and if the sea-level static thrust rating of 24,000 lb drops off in the normal manner, it packs enough power to reach that speed at the tropopause. The maximum sea-level speed is probably over the 600 m.p.h. mark. With the assistance of two batteries of nine 1,000-lb JATO rocket units on each side of the fuselage just aft of the wing, providing an extra boost of 18,000 lb thrust for 2.8 seconds, the resulting take-off and initial climb is quite spectacular, especially for a bomber. Concerning which, it might be noted that as the normal gross weight is 125,000 lb and the wing area only about 1,400 sq ft, a wing loading of nearly 90 lb/sq ft would present quite a ticklish take-off problem without some form of boost assistance. With overload, the JATO installation has even more significance.

There is widespread confusion concerning the range performance of this aircraft, since it has been publicized as having a range of 2,000 miles with a fuel capacity of 15,000 U.S. gallons. Independently, both these figures may be correct, but they cannot possibly be related, for even a six-jet bomber is hardly that thirsty; moreover, such a short range is clearly unrelated to the bombing functions of this design. With a fuel tank stretching all the way back from the cockpit to the rear wheel housing (a length of about 50ft), it is just possible to pour in a tankage of 15,000 U.S. gallons, but as this amount of kerosene weighs slightly over 100,000 lb, it is palpably obvious that it cannot be associated with a normal gross weight of 125,000 lb. Carrying a bomb load of 22,000 lb and full tanks, the overload gross weight could not be much less than 190,000 lb, a figure which hardly seems feasible at this stage of development.

Assuming, therefore, a more reasonable overload weight of 155,000 lb and a reduced tankage of 10,000 U.S. gallons, the maximum range with a bomb load of 22,000 lb can be stretched to 5,600 miles, flying up the hill from 23,000ft to 46,000ft at a nearly constant cruising speed of 465 m.p.h. (Rigorously speaking, for optimum range, the cruising conditions change at the tropopause: the cruising speed increases slightly up the tropospheric part of the incline from 23,000 to 35,000ft, after which it remains constant throughout the stratosphere from 35,000 to 46,000ft.) Once again, then, we see the clear-cut implication of flying fast and high in future jet bomber design.

Because range performance is essentially the crux of future jet bomber design, a final speculation may be worth pursuing in relation to the large tankage built into the XB-47. From the impressive JATO rocketry, which is an integral design feature of this aircraft, it is not too rash, perhaps, to forecast that the normal gross weight of 125,000 lb will be gradually increased by successive structural stages until the full tankage of 15,000 gallons is ultimately reached. As intimated above, the overload gross weight in this condition is estimated at 190,000 lb. (The corresponding wing loading of 136 lb/sq ft is a bit frightening and may take some explaining away!) When, and if, this stage is reached, the bigger J-47 5,000-lb turbo-jet will be ready for the production B-47 airframe, and one begins to see where the large tankage fits into the projected design picture.

An idea of the long-range possibilities now clearly showing over the horizon can be evaluated in terms of range mileage by assuming that the J-47 engine can be cruised at 75-80 per cent of its normal 5,000-lb thrust rating. (This cruising ratio is somewhat higher than current American ratings, but appears to be a reasonable trend in view of British practice.) On a gross weight of 190,000 lb, our slide-rule shows a maximum range of 8,500-9,000 miles with a bomb load of 22,000 lb, and a cruising speed of 560-570 m.p.h., mostly in the stratosphere; indeed, since the final cruise altitude reaches 52,000ft, the pressurization problems of jet bomber design are going to be closely interwoven with the cruising economics.

Whittling Down the Future

Looking down the fourth dimension, say up to 1952, the mainstay of U.S.A.F. strategical bomber groups must depend largely upon the piston-engined Boeing B-29 and B-50 (and, possibly, the compound-engined B-54) for medium ranges in the 4,000-6,000-mile category. It is clear, however, that the bomber spectrum is shifting rapidly to the top right-hand corner of the performance chart; in the realm, that is, of 500 m.p.h. cruising speeds and stratospheric altitudes up to 50,000ft. It follows, therefore, that the piston-engined bomber is going to be outclassed in the medium ranges by the pure jet types, as already evidenced by the Northrop B-49 and the Boeing B-47. Further, for short-range tactical bombing, there can be little doubt that the North American B-45 will replace existing piston-engined types and hold the field for some time, since its present performance can be stepped up by remounting with the J-47 engine.

The real question-mark of the future is the long-range bomber in the 8,000-10,000-mile bracket—the proposed sphere, that is, of the Convair B-36. We have already discounted the Flying Stick as too slow and vulnerable—with a very "soft underbelly" should the range be pushed to 10,000 miles carrying a parasite fighter and extra fuel tanks in the bomb bay. The B-36B, incidentally is reported being groomed for a stunt flight of 12,000 miles under these highly unrealistic combat conditions. The military planners of to-morrow's Air Force now stand at the signpost faced with a momentous decision—whether to take the middle road of the compound and turboprop, or to raise their sights and go boldly out for an all-jet bomber force.

Technically, at any rate, this writer is satisfied that the reflection in the range-finder is focused clearly on the turbo-jet engine—just as Sir Frank Whittle himself prognosticated several years back. Our own range-finder—as seen through the hair-line on a slide-rule cursor—shows that the jet bomber is essentially a stratospheric combat weapon and must be strictly tailored to that specification, along with the rest of the airframe. While it will be some time yet before the all-jet bomber Air Force becomes an operational reality in the U.S.A. rearmament scheme, both the Northrop B-49 and the Boeing B-47 look capable of logical development through their present medium-range status to that of long-range strategical bombers.

Whether the shape of wings to come will take an arrow or a trapezoidal geometry is yet too early to say, and so it is obviously a sound plan to strike out in both directions. In spite of the orthodoxists, however, the all-wing layout looks a logical trend, since by lengthening the root chord in successive stages one arrives step-by-step at the delta configuration. One thing is tolerably certain—the propeller will have no place in the fighter and bomber forces of the future. In keeping with the rest of the airframe, the windmill is being neatly tucked inside and whittled down to a row of turbine blades. Why defeat the elegant simplicity of Whittling by churning up the airflow again with windmills?

PERFORMANCE COMPARISON: AMERICAN JET BOMBERS

Aircraft: (Power Plant)	Gross Weight (lb)	Speed at Altitude		Initial Climb (ft/min)	Service Ceiling (ft)	Bomb Load/Range (lb/miles)
		Maximum (mph/ft)	Cruising (mph/ft)			
North American B-45 (4 GE-Allison J-35)	82,600	530/35,000	410/24-47,000	2,550	38,000	20,000/2,200
Boeing XB-47 (6 GE-Allison J-35)	125,000 155,000	630/35,000 580/35,000	475/31-46,000 465/23-46,000	2,950 2,200	40,000 35,000	22,000/3,700 22,000/5,600
Northrop YB-49 (8 GE-Allison J-35)	220,000	480/35,000	400/27-47,000	1,850	38,000	30,000/5,400

Notes.—(1) Service ceilings are based on initial gross weight at take-off; actual target ceilings are higher. (2) Initial climb of XB-47 does not include JATO boost of 18,000 lb. (3) Gross weight of YB-49 is currently reported at 213,000 lb., but resulting difference in range performance is negligible, since computations were based on a more conservative specific fuel consumption than the cruising values quoted by engine manufacturer.